SHEET INDEX

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RECORDS OF CHANGES

DWG ISS	PREV FURN	STD	MFR DISC	SEE NOTE

NOTES:

1 ⏚ GROUND RETURN

2 UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS
CAPACITANCE VALUES ARE IN MICROFARADS
VALUES PRECEDED BY THE SYMBOL +(PLUS) OR -(MINUS) ARE IN VOLTS

3. BATTERY AND GROUND TERMINALS FOR THIS CIRCUIT PACK ARE AS FOLLOWS:

FUNCTION	TERMINAL
+3V	000, 019
GRD	200, 319
GRD	2G0

4. HORIZONTAL MTG. CENTERS AT 1.0 INCH.

DWG ISSUE	EE OR CD ISSUED	DATE ISSUE		APPD
1		1-25-74	SS/SS NCL	RWF MTS RFG
2A		5-7-75	AS LDD	JJR MTS RFG

SYMBOL

SYSTEM INITIALIZATION (MRF)
TRANSFORMER INTERFACE

ELEMENT IDENT
A

TERM. MOD	FUNCT	TERM.	LOC
T737	I	202	2B1
T781	I	002	2B1
T837	I	003	2A1
T881	I	301	2B1
T74	0	007	2B6
T76	0	006	2B6
T84	0	106	2A6
T86	0	104	2B6

FORCE ON/OFF LINE
TRANSFORMER INTERFACE

ELEMENT IDENT
B

TERM. MOD	FUNCT	TERM.	LOC
T537	I	300	2C1
T581	I	102	2C1
T637	I	201	2C1
T681	I	101	2C1
T54	0	005	2C6
T56	0	103	2C6
T64	0	105	2C6
T66	0	004	2C6

I/0 TRANSFORMER INTERFACE

ELEMENT IDENT
C

TERM. MOD	FUNCT	TERM.	LOC
T137	I	207	2E1
T181	I	307	2E1
T237	I	205	2D1
T281	I	305	2D1
T337	I	108	2D1
T381	I	303	2D1
T437	I	107	2D1
T481	I	008	2D1
T14	0	306	2E6
T16	0	206	2E6
T24	0	304	2D6
T26	0	204	2D6
T34	0	203	2D6
T36	0	009	2D6
T44	0	302	2D6
T46	0	109	2D6

I/0 SEQUENCE RESET MONOPULSER

D

TERM. MOD	FUNCT	TERM.	LOC
STMPO	I	219	2F1
	I	215	2F1
	I	216	2G1
	I	212	2G1
	I	211	2G1
CLKRO	I	318	2F6

27 MS TIMER

ELEMENT IDENT
E

TERM. MOD	FUNCT	TERM.	LOC
27MSTIMO	0	308	2G6
+3V	P	000	2H3
+3V	P	019	2H3
GRD	G	200, 319	2H3
GRD	G	2G0	2H3
STMVO	I	311	2H1

CURRENT DRAIN

20MA AT +3V

SYSTEM USED ON	DESIGN CONTROL
COMMON SYSTEMS	3H

MANUFACTURING REFERENCES

CATEGORY	NO.	
CIRCUIT PACK CODE	FC208	
CONNECTOR ON FRAME	947A OR 947C	
SERIES NO. IDENT	~~FOR LATEST CLASS "A" CHANGE~~	
	ACCEPTABLE SERIES IS	5

SHEET INDEX NOTES

1. WHEN CHANGES ARE MADE IN THIS DRAWING ONLY THOSE SHEETS AFFECTED WILL BE REISSUED.
2. THIS SHEET INDEX WILL BE REISSUED AND BROUGHT UP TO DATE EACH TIME ANY SHEET OF THE DRAWING IS REISSUED, OR A NEW SHEET IS ADDED
3. THE ISSUE NUMBER ASSIGNED TO A CHANGED OR NEW SHEET WILL BE THE SAME ISSUE NUMBER AS THAT OF THE FIRST SHEET.
4. SHEETS THAT ARE NOT CHANGED WILL RETAIN THEIR EXISTING ISSUE NUMBER.
5. THE LAST ISSUE NUMBER OF THE FIRST SHEET INDEX IS RECOGNIZED AS THE LATEST ISSUE NUMBER OF THE DRAWING AS A WHOLE.

NOTICE- NOT FOR USE OR DISCLOSURE OUTSIDE THE BELL SYSTEM EXCEPT UNDER WRITTEN AGREEMENT.

ISSUE
2A

1N9S

FC208 CIRCUIT PACK

SSP I/O SHIFT CONTROL-RESET MONOPULSER
I/O XFORMERS & EMERGENCY ACTION CLOCK
CIRCUIT

②

AT&TCO
STANDARD

CPS-FC208
3 SHEETS

BELL TELEPHONE LABORATORIES
INCORPORATED

6S

PART OF CPS FC208

SSP I/O SHIFT CONTROL-RESET MONOPULSER
I/O XFOHMERS & EMERGENCY ACTION CLOCK

COMPONENT LIST

CAPACITOR

	DESIG	CODE	
	C1	KS-19774,L2,	220pF
	C2	KS-19774.L2,	220pF
	C3	701G,	1.47
	C4	701G,	1.47
	C5	KS-19774,L1,	220pF
[2]	C6, C7	600A,	1uF

DIODE

DESIG	CODE
CR1	458C

RESISTOR

	DESIG	CODE	
[4]	R1-R4	KS-20200,L1,	100
	R5		15
	R6		1.2KΩ
	R7		2.4KΩ
	R8		300
	R9		2.4KΩ
	R10		6.2KΩ
	R11		390
	R12		12KΩ
	R13		390
	R14		10KΩ
	R15	KS-20200,L1,	5.6KΩ

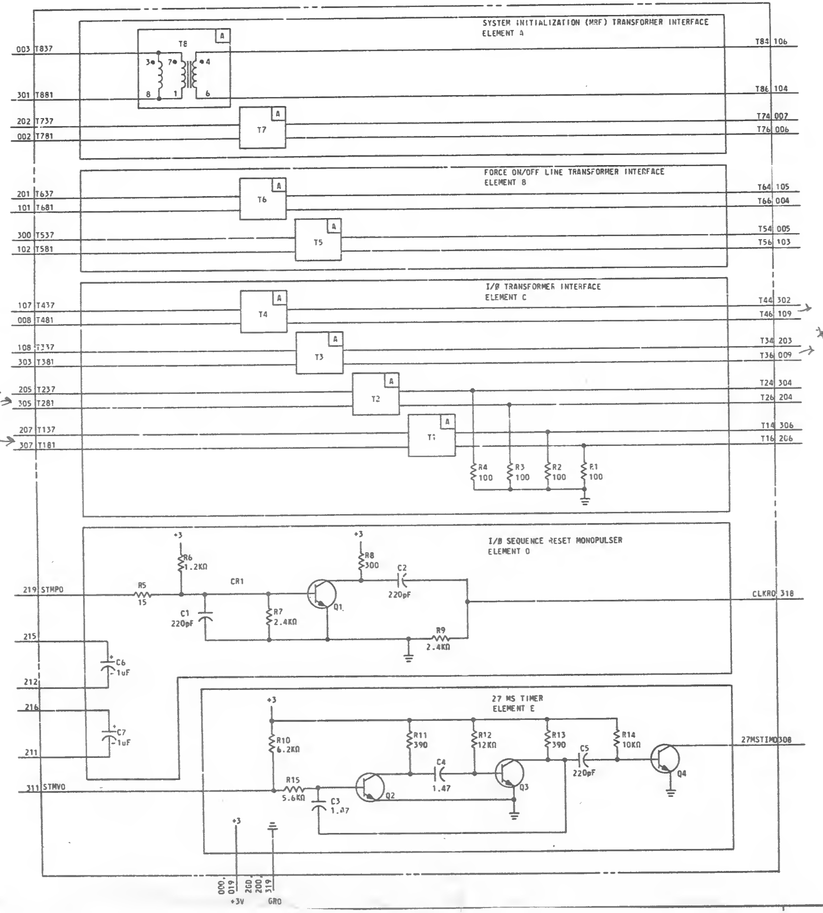
TRANSFORMER

	DESIG	CODE
[8]	T1-T8	2669G

TRANSISTOR

	DESIG	CODE
	Q1	66S
[3]	Q2-Q4	66C

Rcv EL 3w cc



xmt to ec

FC208 CIRCUIT PACK

②

BELL TELEPHONE LABORATORIES
INCORPORATED

6S

CPS-FC208
SHEET 2

PRINTED IN U.S.A.

ISSUE
2A

CPS-FC208

PART OF CPS FC208

CIRCUIT DESCRIPTION

CIRCUIT DESCRIPTION

A. FUNCTION

THIS CIRCUIT PACK PROVIDES:

(1) EIGHT TRANSFORMER INTERFACE CIRCUITS FOR AC SIGNAL BUSSING

(2) ONE I/O SEQUENCE MONOPULSER THAT RESPONDS TO 1A LOGIC LEVEL INPUT PULSES >70 NS AND PROVIDES OUTPUT PULSES (TO A 1A LOGIC BUFFER INVERTER GATE) >30 NS

(3) ONE 27-MS TIMER CIRCUIT THAT PROVIDES A CONTINUOUS UNSYMMETRICAL SQUARE WAVE WITH A 27-MS PERIOD

B. DETAILED DESCRIPTION

THIS CIRCUIT PACK IS MADE UP OF FIVE INDIVIDUAL ELEMENTS AS FOLLOWS:

ELEMENT A - SYSTEM INITIALIZATION (MRF) TRANSFORMER INTERFACE

ELEMENT B - FORCE ON/OFF LINE TRANSFORMER INTERFACE

ELEMENT C - I/O TRANSFORMER INTERFACE

ELEMENT D - I/O SEQUENCE RESET MONOPULSER

ELEMENT E - 27-MS TIMER

ELEMENTS A THROUGH C

THE SYSTEM INITIALIZATION (MRF) TRANSFORMER INTERFACE PROVIDES THE AC ISOLATION REQUIRED IF SIGNAL SOURCE AND RECEIVERS ARE SUBJECT TO DIFFERENT GROUND POTENTIALS. THE SAME IS TRUE FOR THE TRANSFORMERS OF ELEMENTS B AND C. IN ALL CASES THE TRANSFORMERS ARE 1-TO-1 WITH THE WINDINGS CONFIGURED AS IN ELEMENT A (TRANSFORMER T8). EACH INPUT/OUTPUT LEAD NAME DESCRIBES THE PHYSICAL CONNECTION AS IN ELEMENT A. FOR EXAMPLE, T837 SPECIFIES TRANSFORMER T3 TERMINALS 3 AND 7. TRANSFORMERS T3 THROUGH T8 ARE USED FOR INFORMATION TRANSMISSION FROM THE NO. 2B/NO. 3 ESS SYSTEM STATUS PANEL CONTROLLER (SSPC). TRANSFORMERS T1 AND T2 ARE USED AS RECEIVERS FOR INFORMATION TRANSMITTED FROM THE 3A CC TO THE SSPC.

THE RECEIVER TRANSFORMERS ARE TERMINATED WITH 100-OHM RESISTORS (FROM EACH OUTPUT NODE) TO GROUND. WHEN CONNECTED TO 1A CLIPPING CIRCUITS, THE NOMINAL TERMINATING IMPEDANCE TO A POSITIVE PULSE LOBE IS 100 OHMS AND THE NEGATIVE LOBE IS CLAMPED TO A SMALL NEGATIVE POTENTIAL BY THE CLIPPING CIRCUIT. THESE TRANSFORMERS CONFIGURED IN THIS MANNER ARE CAPABLE OF TRANSMITTING AND RECEIVING AT A RATE GREATER THAN THE 6.7-MEGAHERTZ RATE REQUIRED FOR THE NO. 2B ESS AND NO. 3 ESS CONFIGURATIONS.

ELEMENT D - I/O SEQUENCE RESET MONOPULSER

THIS ELEMENT GENERATES A PULSE AT THE END OF EACH I/O MESSAGE RECEIVED BY THE SSPC. THE PULSE RESETS THE I/O SEQUENCE LOGIC CONTAINED IN THE SSPC.

IN GENERAL, AN INPUT TO STMPO THAT IS GREATER THAN 70-NS DURATION WILL DISCHARGE CAPACITOR C1, AND THUS TURN OFF TRANSISTOR Q1. THE DISCHARGE TIME OF C1 IS MUCH QUICKER THAN THE MINIMUM TURNOFF TIME OF Q1, THUS THE 70-NS TURNOFF TIME. A NEGATIVE TRANSITION OUTPUT PULSE OCCURS APPROXIMATELY 200 NS AFTER REMOVAL OF THE INPUT PULSE. WHEN OPERATING INTO A 1A LOGIC BUFFER INVERTER THE OUTPUT PULSE IS EFFECTIVE FOR APPROXIMATELY 100 NS.

ELEMENT E - 27-MS TIMER

THE 27-MS TIMER IS USED TO DRIVE THE PANEL TIMEOUT COUNTER IN THE SSPC AND AS CLOCKING FOR THE FORCE ACTIVE FUNCTIONS. THE TIMER PRODUCES A CONTINUOUS UNSYMMETRICAL SQUARE WAVE WITH A 27-MS PERIOD AT OUTPUT 27MSTIMD. WHEN GROUNDED, INPUT STMVO PROVIDES THE MEANS TO INITIALIZE THE MULTIVIBRATOR CIRCUIT FROM A 1A OPEN COLLECTOR GATE.

THE MULTIVIBRATOR ITSELF PRODUCES A SYMMETRICAL SQUARE WAVE WITH A PERIOD OF 27 MS. THE COMPONENTS THAT COMPRISE THE MULTIVIBRATOR ARE R10, R11, R12, R13, R15, C3, C4, Q2, AND Q3. COMPONENTS C5, R14, AND Q4 COMPRISE A BUFFER TO EXTERNAL CIRCUITS WITH C5 AND R14 ACCOUNTING FOR THE UNSYMMETRICAL OUTPUT.

CIRCUIT DESCRIPTION (CONT)

C. SYMBOL/LEAD MNEMONICS

27MSTIMD	27-MILLISECOND PERIOD UNSYMMETRICAL SQUARE WAVE OUTPUT.
CLKRO	CLOCK RESET OUTPUT, GROUND ACTIVE. USED IN SSPC TO RESET SHIFT REGISTER CONTROL STATES (FA1101) AND SHIFT PULSE DECODER CIRCUIT APPEARING IN ELEMENT A OF FA1102 WHEN EACH I/O TRANSMISSION HAS ENDED.
C6+	POSITIVE TERMINAL OF 1µF CAPACITOR C6
C6-	NEGATIVE TERMINAL OF 1µF CAPACITOR C6
C7+	POSITIVE TERMINAL OF 1µF CAPACITOR C7
C7-	NEGATIVE TERMINAL OF 1µF CAPACITOR C7
STMPO	START MONOPULSER. A GROUNDED INPUT DISCHARGES CAPACITOR C1. WHEN THE GROUND IS REMOVED, C1 WILL CHARGE UNTIL TRANSISTOR Q1 TURNS ON AND GENERATES A NEGATIVE GOING OUTPUT AT CLKRO.
STMVO	START MULTIVIBRATOR, GROUND ACTIVE. THIS INPUT INITIALIZES THE MULTIVIBRATOR CIRCUIT DURING AN SSPC POWER-UP SEQUENCE.

T14	TRANSFORMER T1	TERMINAL 4
T16	TRANSFORMER T1	TERMINAL 6
T137	TRANSFORMER T1	TERMINALS 3 AND 7
T181	TRANSFORMER T1	TERMINALS 8 AND 1
T24	TRANSFORMER T2	TERMINAL 4
T26	TRANSFORMER T2	TERMINAL 6
T237	TRANSFORMER T2	TERMINALS 3 AND 7
T281	TRANSFORMER T2	TERMINALS 8 AND 1
T34	TRANSFORMER T3	TERMINAL 4
T36	TRANSFORMER T3	TERMINAL 6
T337	TRANSFORMER T3	TERMINALS 3 AND 7
T381	TRANSFORMER T3	TERMINALS 8 AND 1
T44	TRANSFORMER T4	TERMINAL 4
T46	TRANSFORMER T4	TERMINAL 6
T437	TRANSFORMER T4	TERMINALS 3 AND 7
T481	TRANSFORMER T4	TERMINALS 8 AND 1
T54	TRANSFORMER T5	TERMINAL 4
T56	TRANSFORMER T5	TERMINAL 6
T537	TRANSFORMER T5	TERMINALS 3 AND 7
T581	TRANSFORMER T5	TERMINALS 8 AND 1
T64	TRANSFORMER T6	TERMINAL 4
T66	TRANSFORMER T6	TERMINAL 6
T637	TRANSFORMER T6	TERMINALS 3 AND 7
T681	TRANSFORMER T6	TERMINALS 8 AND 1
T74	TRANSFORMER T7	TERMINAL 4
T76	TRANSFORMER T7	TERMINAL 6
T737	TRANSFORMER T7	TERMINALS 3 AND 7
T781	TRANSFORMER T7	TERMINALS 8 AND 1
T84	TRANSFORMER T8	TERMINAL 4
T86	TRANSFORMER T8	TERMINAL 6
T837	TRANSFORMER T8	TERMINALS 3 AND 7
T881	TRANSFORMER T8	TERMINALS 8 AND 1

ISSUE 2A

FC208 CIRCUIT PACK

BELL TELEPHONE LABORATORIES
INCORPORATED

6S

CPS-FC208
SHEET 3

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